

## Systematic Study of Dolichoderinae (Hymenoptera: Formicidae) in Korea

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**ABSTRACT** Based on the specimens of the Dolichoderinae collected from South Korea, we identified four species under three genera. In this paper we provided diagnostic descriptions of these four species and list of five unconfirmed species recorded in North Korea.

**Key words :** Systematics, Formicidae, Dolichoderinae, Korea

It is known that the world fauna of the subfamily Dolichoderinae consists of 250 species of 25 genera under 3 tribes. Generally most of them are found under soil, stones, and fallen trees, but some occur in cavities of plants, on tree branches, and under the barks. Some genera, *Iridomyrmex*, *Azteca*, and *Technomyrmex* show symbiosis with plants. Some feed on liquid or plant nectars, others have food relationships with homopterous insects. There have been some reports that crops are damaged by *Iridomyrmex*, *Tapinoma*, and *Azteca* (Morisita et al., 1992).

Workers of the Subfamily Dolichoderinae have well developed compound eyes, but ocelli are almost absent. Antennae are generally 12 segmented, but some are ten to eleven segmented. Petiole is one segmented, and scale-like to cylindrical. Connection between postpetiole and first tergite is concave. Four segments of gaster are visible viewed from above, and there is circular orifice but a slit through which viscous defensive fluid is passed. Queens are larger than workers, and always have ocellus and large thorax and abdomen. Males have ocellus, well developed thorax, and round petiole. It is strange that *Technomyrmex* do not produce males which have wings.

In Korea *Technomyrmex gibbosus* was recorded for the first time by Teranishi (1940). Since then, *Ochetellus itoi* (Forel) was recorded by Imai and Yosida (1964), *Iridomyrmex glaber* (Mayr), *Tapino-*

*ma sinense* Emery, *Tapinoma wroughtoni* Forel, and *Technomyrmex albipes* (Smith) by Collingwood (1976), *Iridomyrmex glaber* (Mayr), *Tapinoma geei* Wheeler, and *Bothriomyrmex wroughtoni* by Terayama et al. (1992). The following species, *Tapinoma geei* Wheeler, *Tapinoma sinense* Emery, *Tapinoma wroughtoni* Forel, *Bothriomyrmex wroughtoni* Forel, and *Technomyrmex albipes* were recorded in North Korea (Collingwood, 1976, 1981). Authors were not able to collect them in South Korea. In this study, we provided keys and diagnostic descriptions of four species, which we were able to collect.

### MATERIALS AND METHODS

Materials for this study were collected from South Korea between 1981 and 1998. As soon as they were collected, they were fixed in alcoholic Bouin's solution (150 ml of 80% ethanol, 15 ml of formaldehyde, and 1 g of picric acid) for two or three days. They were then moved to 85% ethanol for preservation. They were examined using Wild M8 stereo zoom microscope. Four species available were diagnostically redescribed and five unconfirmed species, which occur in North Korea were cited by the related references. Plates were made based on external diagnostic characters, and keys were made based on the system of Collingwood (1979). All these informations were based on workers.

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## SYSTEMATIC ACCOUNT

### Key to genera of Dolichoderinae

1. Petiole scale form ..... 2
  - Petiole thick and cylindrical ..... 3
2. Posterior dorsum of propodeum posteriorly protruded ..... *Dolichoderus*
  - Posterior dorsum of propodeum flat ... *Ochetellus*
3. Straightly connected between mesonotum and propodeum ..... *Tapinoma*
  - Concave as V between mesonotum and propodeum ..... *Technomyrmex*

### Tribe 1. *Dolichoderini* Teranishi, 1930:

시베리아개미족

Type genus: *Dolichoderus* Lund

#### Genus 1. *Dolichoderus* Lund, 1831: 130

시베리아개미속

Type species: *Formica attelaboides* Fäbricius, 1775: 394.

#### 1. *Dolichoderus sibiricus* (Emery, 1889)

시베리아개미

*Dolichoderus quadripunctatus sibiricus* Emery, 1889: 442; Kim, 1963: 345.

*Hypoclinea quadripunctatus sibirica*: Emery, 1894: 229.

*Hypoclinea sibirica*: Yasumatsu, 1962: 96; Collingwood, 1976: 299; Collingwood, 1981: 26; Terayama et al., 1992: 32; Kim et al., 1993: 120.

*Dolichoderus sibiricus*: Bolton, 1995: 176.

**Previous Records:** Pyöngyang, Kyöngsöng (Collingwood, 1976, 1981), Hanllasan (Terayama et al., 1992).

**Specimens Examined:** Kap'yong, Kyönggi-do (V. 31.91, Kim).

**Diagnosis:** Body length about 3 mm. Head, propodeum and petiole reddish brown. Mandibles yellowish brown, with well developed teeth and posterior area sawlike. Anterior central area of clypeus concave. Antennae 12 segmented and antennal scape a little over-reaching occipital border. Compound eye comparatively developed. Dorsum of thorax flat and connected area to propodeum roundly concave. Dorsum of propodeum posteriorly protruded. Petiole thick and a little concave in dorsal view. Postpetiole and tergite without erect hairs. Postpetiole and tergite individually

with a pair of distinct yellow spots.

**Distribution:** Korea, Russia, Japan.

### Tribe 2. *Tapinomini* Emery, 1912: 17

흰발마디개미족

Type genus: *Tapinoma* Foester, 1850: 43.

#### Genus 2. *Iridomyrmex* Mayr, 1862: 702

흰발마디개미속

Type species: *Formica detecta* Smith, 1858: 36.

#### 2. *Iridomyrmex glaber* (Mayr, 1862) 흰발마디개미

*Iridomyrmex glaber* Mayr, 1862: ?; Terayama et al., 1992: 32; Kim et al., 1993: 121

**Previous Records:** Köjedo, Hongdo, Odongdo, Namhaedo, Hansando, Maemuldo. Hanllasan (Terayama et al., 1992).

**Specimens Examined:** None.

**Distribution:** Korea, China, Japan.

**Remark:** Morisita (1991) cited that this species was regarded as synonym of *Ochetellus itoi* by Brown (1958).

#### Genus 3. *Ochetellus* Shattuck, 1992: 16

도랑마디개미속

Type species: *Hypoclinea glabra* Mayr, 1862: 702.

#### 3. *Ochetellus itoi* (Forel, 1900) 도랑마디개미 (신칭)

*Iridomyrmex itoi* Forel, 1900: 269; Wheeler, 1928: 116; Imai and Yosida, 1964: 64; Kim et al., 1994: 296.

*Iridomyrmex itoi* var. *abbotti* Wheeler, 1906.

*Ochetellus itoi* Forel: Shattuk, 1992: 17.

**Previous Records:** This species occurred in Korea, but collected sites were not given.

**Specimens Examined:** CB; Eoch'öng-do, Okku-gun (VIII. 6. 93), Kusipo, Koch'ang-gun (IV. 9. 94, Kim); CN; Sumun-ri, Changhüng-gun (VI. 12. 94, Kim); Myongsasimri, Wando-gun (VI. 24. 94, Kim); Odongdo, Yösu-shi (IV. 29. 94, Kim); Sinjido, Muan-gun (VI. 24. 94, Kim); Tanghangpo, Namhae-gun (VI. 13. 94): CJ; Könip-dong (V. 16. 92, Kim); Kwaneomsa (V. V. 92); Tökch'ön-ri, Kujwa-ü (V. 16. 92, Kim); Tongkwang-ri (V. 16. Kim); Söguip'o-shi (V. 13. 92, Kim); Aewöl (V. 16. 92, Kim).

**Diagnosis:** Body length 2 mm. Body from black to dark brown. Mandibles with 8 teeth. Antennae 12 segmented and scape short, not over-reaching occipital border. Compound eyes comparatively

developed. Thorax and propodeum without erect hairs. Thorax from pronotum to mesonotum almost straight and concave in connection with propodeum. Epinotal spiracles nearly round located in posterior area. Petiole U shaped in anterior and thin plate in profile.

**Distribution:** Korea, Japan.

#### Genus 4. *Tapinoma* Foerster, 1850: 43

마디개미속

Type species: *Tapinoma collina* Foerster, 1850: 43.

#### 4. *Tapinoma geei* Wheeler, 1927 민마디개미

*Tapinoma geei* Wheeler, 1927: 8; Terayama et al., 1992: 33.

**Previous Records:** Though this was found in North Korea, collected sites are not given in the references.

**Specimens Examined:** None.

**Distribution:** Korea, China.

#### 5. *Tapinoma sinense* Emery, 1925 루튼민마디개미

*Tapinoma sinense* Emery, 1925: 61; Collingwood, 1976: 299; Terayama et al., 1992: 33.

**Previous Records:** Desangsan, Lyongaksan, Sagampo, Nüngrado (Collingwood, 1976, 1981).

**Specimens Examined:** None.

**Distribution:** Korea, China.

#### 6. *Tapinoma wroughtoni* Forel, 1904 루튼마디개미

*Tapinoma wroughtoni* Forel, 1904: 26; Collingwood, 1976: 299; Terayama et al., 1992: 33.

**Previous Records:** Desangsan, Zamosan (Collingwood, 1976).

**Specimens Examined:** None.

**Distribution:** Korea, India

#### Genus 5. *Bothriomyrmex* Emery, 1869: 117

소공마디개미속 (신칭)

Type species: *Bothriomyrmex costae* Emery, 1869: 118.

#### 7. *Bothriomyrmex wroughtoni* Forel, 1895

루튼소공마디개미 (신칭)

*Bothriomyrmex wroughtoni* Forel, 1895: 470; Bingham, 1903: 307; Terayama et al., 1992: 33.

**Previous Records:** Though this species was found in North Korea, collected sites were not given in the references.

**Specimens Examined:** None.

**Distribution:** Korea, China, Japan, India.

#### Genus 6. *Technomyrmex* Mayr, 1872: 147

납작자루개미속

Type species: *Technomyrmex strenuus* Mayr, 1872: 147.

#### Key to species of Genus *Technomyrmex*

1. Tergite with 1-3 erect hairs. Compound eyes located in middle area in profile ..... *albipes*
- Tergite without erect hairs. Compound eyes located in anterior area in profile ..... *gibbosus*

#### 8. *Technomyrmex albipes* (Smith, 1861)

흰발납작자루개미

*Technomyrmex albipes* Smith, 1861; Collingwood, 1976: 299; Terayama et al., 1992: 33.

**Previous Records:** Desangsan, Pyongannamdo (Collingwood, 1976).

**Specimens Examined:** None.

**Diagnosis:** Body length 2.5 mm. Body black to dark brown. Each appendages light yellow.

Head as long as width. Mandibles saw-like with 15 teeth above or below. Two anterior ones more developed than others. Compound eyes nearly located in middle area in profile. Antennal scapes more or less long, over-reaching occipital border. A pair of erect hairs individually on the prothorax, mesothorax, and propodeum. Each segment of tergites with erect hairs (Terayama et al., 1992).

**Distribution:** Korea, China.

#### 9. *Technomyrmex gibbosus* Wheeler, 1906

납작자루개미

*Technomyrmex gibbosus* Wheeler, 1906: 319; Teranishi, 1940: 5; Kim, 1963: 345; Kim, 1970: 483; Terayama et al., 1992: 33; Kim et al., 1993: 121.

**Previous Records:** Suwon, Kanghwado, Chŏngju, Hongdo, Chejudo (Collingwood, 1981).

**Specimens Examined:** CB; Iksan (V. 17.93, Kim).

**Diagnosis:** Body length 2.5-3 mm. Body reddish brown to yellowish brown. Head reddish brown. thorax and appendages yellowish brown. Mandibles yellowish brown with 11 or more teeth. Only a anterior one large and remainders saw-like. Anterior middle area concave. Compound eyes located in anterior area in profile. Antennae 12 segmented and scapes over-reaching occipital bor-

der without erect hairs. Dorsum of thorax flat and concave as V shaped in connection with propodeum. Epinotal spiracles round located in marginal area. Petiole cylindrical not covered by abdomen. Postpetiole, first, and second tergites without erect hairs.

**Distribution:** Korea, Japan.

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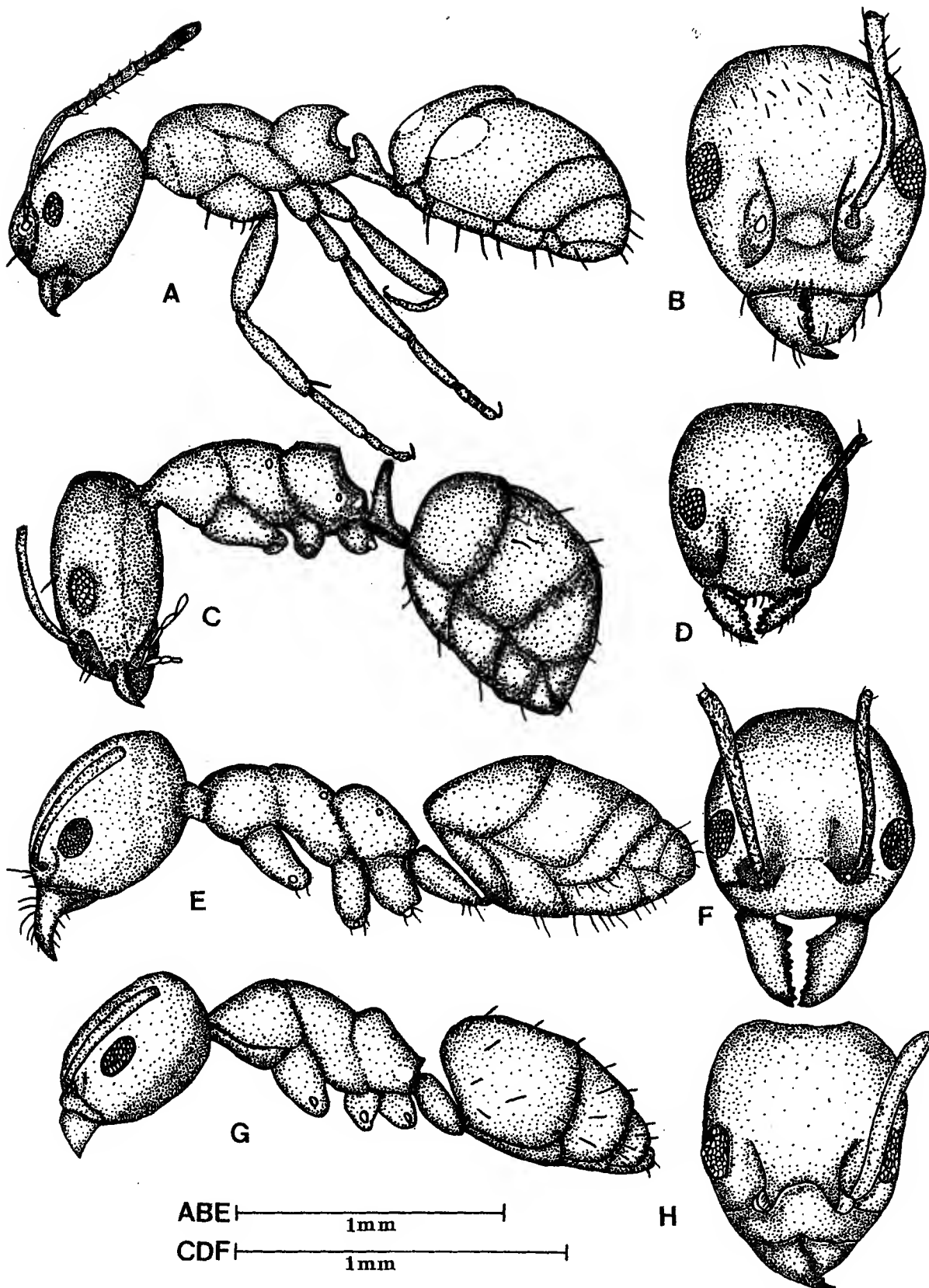


Fig. 1. A: Profile view of *Dolichoderus sibiricus*. B: Head of *Dolichoderus sibiricus*. C: Profile view of *Ochetellus itoi*. D: Head of *Ochetellus itoi*. E: Profile view of *Technomyrmex gibbosus*. F: Head of *Technomyrmex gibbosus*. G: Profile view of *Technomyrmex albipes*. H: Head of *Technomyrmex albipes*.